

REMARKS

Claims 1, 3-13 are pending in the application, claims 14-28 having been withdrawn by the Examiner. Claim 2 is cancelled. Claims 1, 4-6, 8, and 10, have been amended. Claims 4-6, 8 and 10 are amended to correct for dependence from a now cancelled claim. Amendment to claim 1 is supported by disclosure within the specification, specifically, paragraphs [0026]-[0027], thus, no new matter is introduced. The following arguments are presented on the merits and are believed to place the claims in condition for allowance.

Rejection under 35 USC 112 First Paragraph is Traversed

The Examiner has sustained his rejection of Claims 1-13 under 35 USC 112 First Paragraph, stating:

. . . others skilled in the art would be unable to practice the invention as claimed without undue experimentation and with a reasonable expectation of success, other than using a mutated glucose binding protein which includes one amino acid substitution selected from the group consisting of a cysteine at position 74, a cysteine at position 149 , or a cysteine at position 213 results in signal-enhanced glucose detection as evidenced by figure 1 and figure 8 of the instant application.

Applicants respectfully traverse the rejection.

In making the 35 USC 112 First Paragraph rejection, the Examiner focuses on the mutant protein of claim 1 and its dependents and asserts that “the claims broadly encompass a group of amino acid substitutions for a mutated glucose binding protein which are clearly beyond the scope of the instant disclosure.” (Office Action, November 9, 2004, page 3). Applicants respectfully disagrees with the Examiner’s assessment of the specification in relation to mutated binding proteins. In order to expedite prosecution and to more clearly indicate that which Applicants regards as its invention, Amended claim 1 now recites glucose/galactose binding protein mutated such that a least one cysteine group is

substituted or added. This genus is clearly supported by the scope of the specification and for the reasons set forth below provides allowable subject matter.

The Examiner acknowledges that the specification is enabling for a mutated glucose binding protein with amino acid substitutions cysteine at positions 74, 149, and 213. Thus, the Examiner acknowledges that representative examples of the claimed genus of mutant glucose/galactose binding proteins with substituted or added cysteines are enabled. Additionally, Examples of mutated glucose/galactose protein synthesis are given in paragraphs [0052]-[0059] of Applicants' specification.

Having provided specific examples of cysteine mutations 74, 149, and 213 for glucose/galactose binding protein - recognized by the Examiner to be enabled and said mutations prepared as described in the specification - the claims now presented are fully capable of being reduced to practice, with no technological problems that would require more than ordinary skill and a reasonable time in order to obtain an operative, useful embodiment. Therefore, claim 1 is of proper breath and scope for all mutations of the glucose/galactose binding protein having a substituted or added cysteine group, and especially so for those enumerated mutations recited in claims 6 and 12.

Applicants also assert that since site mutations 149 and 213 are dependently claimed (claims 8-9 and 10-11, respectively), in accord with the Examiner's statement as to their specific enablement *supra*, rejection under 112 first paragraph is improper.

Reconsideration and withdrawal of the rejection is respectfully requested.

Rejections under 35 USC 102 As Being Anticipated by Lakowicz (US 6,197,534) Or By Hellinga (US 6,277,627) are Traversed

The Examiner has sustained the rejection of claims 1-13 under 35 U.S.C. 102(b) as being anticipated by Lakowicz (US 6197534) or by Hellinga (US 6277627). The Examiner states:

Each of the cited references teach a sensor comprising a modified glucose binding protein (see '534 patent, i.e., for example, claims 30, 32, 33, 34, 35, 37, 38, and 40, columns 15 and 16 and '627 patent, i.e., for example, claim 1, column 11). Further, Lakawicz [sic] et al. expressly teach the protein is modified by substituting at least one cysteine residue (see, i.e., for example, claims 37 and 38, columns 15 and 16). Lakawicz [sic] discloses polymeric layers containing labeled glucose/galactose binding protein (see, i.e., for example, column 11, lines 53-54).

Applicants respectfully traverse the rejection.

For there to be anticipation, the cited prior art must teach, expressly or impliedly, each and every element of the claim. The present invention is directed to binding proteins coupled to a sensor surface capable of detecting binding of analyte by changes in refractive index. On these distinctions, the cited art fails to anticipate Applicants present invention as recited in claim 1 and its dependent claims.

As recited in the specification, Applicants provide various embodiments of such "sensor surfaces" to which a binding protein may be coupled for measuring changes in refractive index. For example, in one embodiment, the sensor surface substrate may be comprised of glass or plastic, *upon which is layered a suitable metal* having conduction band electrons capable of resonating with light at a suitable wavelength. (See paragraph [0040]). In an alternative embodiment, the surface may comprise optical fiber having *long period gratings* (LPG) to detect changes in refractive index. (See paragraph [0050]).

Hellinga makes no mention of a sensor surface at all, and therefore cannot teach or suggest the coupling a cysteine of the binding protein to such a sensor surface, and therefore cannot teach or suggest detection of a refractive index change.

In the alternative, the Examiner suggests that Lakowicz teaches “polymeric layers containing labeled glucose/galactose binding protein (see, i.e., for example, column 11, lines 53-54).” However, Lakowicz fails to teach or suggest coupling of the cysteine group to said polymer layer and detecting changes in refractive index. Even if Lakowicz taught such coupling to the polymeric layer, without a suitable metal coating, or without gratings, said polymeric layer cannot provide the means for detecting changes in refractive index.

Finally, and in stark contrast to Applicants invention, the teachings of Lakowicz and Hellings both teach attaching a fluorophore to the mutated binding protein for detection of ligand binding only by fluorescence and not for refractive index change. Neither reference teaches or suggests substitution of a fluorophore with a sensor surface, or detection by fluorescence with detection by refractive index. Therefore, neither reference anticipates.

Reconsideration and withdrawal of the rejection is respectfully requested.

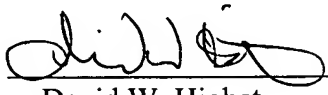
CONCLUSION

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact David W. Highet, at the telephone number listed below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-1666 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

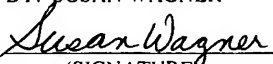
Respectfully submitted,

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| BY: SUSAN WAGNER  (SIGNATURE) | <u>12/13/04</u> (DATE) |